

consistent with the requisite strength. Hollow bricks, light tiles, with *papier-maché* for internal decorations, have been recommended as materials suitable for super-structures. At the present time the city of Manila, partly through Government interference, and partly through the desire of the inhabitants to reduce the chances of farther disasters, presents a singular appearance of light super-structures rising from old foundations. Iron roofs are visible in all directions, whilst on the massive basements of old cathedrals and churches upper stories of wood, with cupolas and spires of corrugated iron, have been erected.

Although the suggestions embodied in the above notes are few in number, it is hoped that they may be of some practical value. Without extending them, they show us that, even though we may not be in the position to escape from earthquakes by forewarning ourselves of their approach, we can at least mitigate the effects of these disasters by proper construction.

JOHN MILNE

Tokio

### THE LATE ERUPTION OF VESUVIUS

OUR visit to the crater of Vesuvius on January 11, 1884, was a most interesting one. In my former letter I gave the rough details of this new eruption as well as could be ascertained from the base of the cone. The lava that issued on Tuesday night continued to flow till Wednesday evening, but seemed to have arrested its progress about 10 o'clock that night, when I was in the Atrio del Cavallo. This stream proved to have welled out at the base of the little cone of eruption and to have flowed across the solid lava plain in the crater of 1872, and then to have poured down the north-north-west slope of the cone till it reached the Atrio, across which it extended but little. Within the crater of 1872 we have a somewhat convex plain of lava, which is continuous with, or, more properly, overlaps, the crater edges, except for a short distance on the south-south-west side. The north-east part of this is covered by the remnants of the crater of January, 1882. Within this were a series of crater rings that have since filled up to a certain extent the cavity of 1882. For some time the vent has travelled south, so that the present cone of eruption overlaps the crater ring of January, 1882, on its south side, whereas there is a deep crescentic fossa between the present cone and the north crater ring of two years since. The vent was giving forth great volumes of vapour, and there was an almost continuous fountain of fragments of molten lava, which often attained the height of one or two hundred yards. As a consequence much filamentous lava, often as fine as cotton, was raining around the crater, and as we sat there eating our lunch, it was so covered with these rock fragments, that it required a long climb on foot to make such a gritty meal palatable. The ejectamenta are composed solely of lava in detached pieces, ejected in a plastic state with a few bombs, consisting of older solid lava fragments partially fused and rounded on the surface, which is varnished irregularly by the fluid magma that enveloped them. This indicates that the lava is very near the top of the chimney, which must be full, as it has been for some time. Photography was no easy matter amidst this fiery bombardment, for such was the abundance of the ejectamenta that we could see how rapidly the cone of the eruption was growing. I made a rough calculation of the quantity of new material expelled, and I think six cartloads in four seconds as quite a fair estimate. The lava that had flowed was solid and cold enough to allow my dog to cross it with ease, though through a few cracks it was seen to be still incandescent, and a green staff thrust in immediately blazed. The lava that was flowing in the direction of Pompeii is still doing so in one or two points, apparently at the same rate and place as two weeks since.

Altogether this eruption seems to be of very little importance, and during the last four years there have been many similar ones. Prof. Palmieri, in the *Corriere del Mattino* of January 11, prophesies a great eruption, but on what grounds it seems difficult to make out. No one would deny that such could occur and is not improbable; but there seems to be no more reason now than two months since.

The smoke or vapour yesterday had, when seen by reflected light, the same colour as usual, namely, a salmon tint. The sky was very clear, and I looked at the sun through this vapour, bearing in mind the recent remarkable sunsets and green suns. The transmitted light ranged from a *burnt sienna* brown to a dirty orange, having much the same colour as when we look through a dark London fog. I noticed that the light that traversed the vapour column and fell on the opposite escarpment of Monte Somma was of a colour that would be obtained by mixing a mauve with about equal quantities of brown.

Naples, January 13

H. J. JOHNSTON-LAVIS

### THE EGYPTIAN SUDAN AND ITS INHABITANTS

AS some degree of vagueness seems still attached to the term Sudan, it may be well to state at once that it is simply the Arabic equivalent of the older and more intelligible expressions, Nigritia, Negroland, which have in recent times somewhat unaccountably dropped out of use. In its widest sense it comprises the more or less fertile zone lying between the Atlantic on the one hand and the Red Sea and Abyssinian Highlands on the other, and stretching from the Sahara and Egypt Proper southwards to the Gulf of Guinea, and the still unexplored Central Equatorial regions, and further east to Lakes Albert and Victoria Nyanza. This vast tract, which may on the whole be regarded as the true domain of the African Negro race, is commonly and conveniently divided into three great sections:—(1) *Western Sudan*, comprising roughly the basins of the Senegal and Quorra-Binue (Niger) with all the intervening lands draining to the Atlantic; (2) *Central Sudan*, comprising the basins of the Komadugu and Shari with all the lands (Kanem, Bornu, Baghirmi, Wadai) draining to Lake Chad; (3) *Eastern Sudan*, comprising everything east of Wadai, that is mainly the Upper and Middle Nile basin.

Politically, this third section, with which alone we are here concerned, has for some years formed part of the Khedive's possessions, hence is now more generally known as *Egyptian Sudan*. Until 1882 it formed a single administrative division under a Governor-General resident at Khartum. But in that year a sort of Colonial Office was created for this region, which was placed under a Cabinet Minister and broken up into four separate departments or divisions, each under a Hukumdar, or Governor-General, directly responsible to the Minister for Sudan at Cairo. The various provinces hitherto forming the single administration of Egyptian Sudan thus became distributed as under:—

WEST SUDAN, comprising Darfur, Kordofan, Bahr-el-Ghazal, and Dongola, with capital Fasher.

CENTRAL SUDAN, comprising Khartum, Senaar, Berber, Fashoda, and the Equator (Hat-el-Istwa), with capital Khartum.

EAST SUDAN, comprising Taka, Suakin, and Massowah, with capital Massowah.

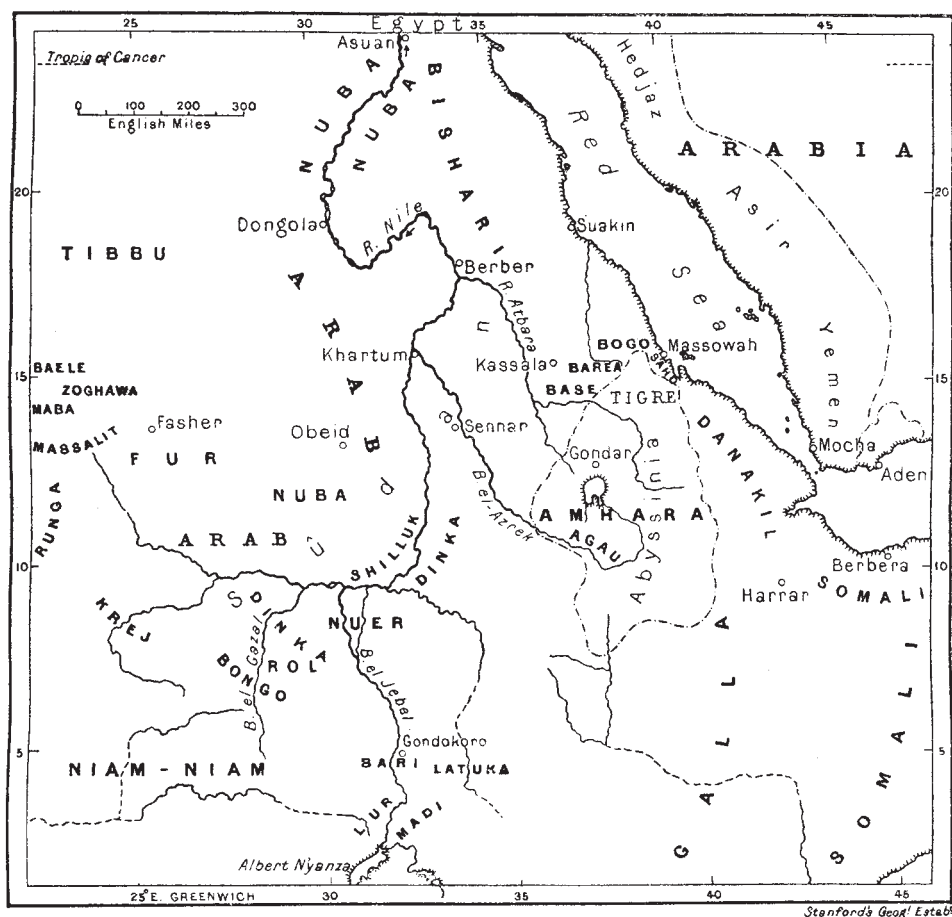
HARRAR, comprising Zeyla, Berbera, and Harrar, with capital Harrar.

The complete development of this scheme has been somewhat rudely interrupted by the successful revolt of the "Mahdi," who has for the moment wrested the greater part of the country from Egyptian control. But should this arrangement be carried out after the restoration of order, a further element of confusion will be introduced

into African geographical nomenclature, for we shall then have three political subdivisions of Egyptian Sudan bearing the same names as the three above described physical subdivisions of the whole region.

These however are matters of detail, with which statesmen do not usually concern themselves, and apart from the terminology the projected arrangement in this instance really recommends itself both on geographical and ethnological grounds. Thus the provinces of Darfur, Kordofan, and Dongola, forming the bulk of "Central Sudan," present a certain physical uniformity in the somewhat steppe-like character of the land, destitute of forest timber and covered mostly with prickly grass, scrub, gum trees, mimosas, and other thorny plants. It is intersected by no large streams, and generally open

except towards the west, where the Marrah range forms a water-parting between the few rivers and intermittent torrents flowing south-east to the Nile and south-west through the Bahr-es-Salamat to the Shari. The inhabitants also are of a somewhat homogeneous character, the aborigines belonging mainly to the old Nuba stock almost everywhere interspersed with nomad and slave-hunting Arab tribes. This region communicates with the Nile through two historical caravan routes, one running from El Obeid north-north-east to Khartum, the other from Fasher north-east to El Dabbeh above Old Dongola. Through these outlets the produce of the land—gums, ivory, ostrich-feathers, and slaves—have for ages been forwarded down the Nile to Egypt, the natural emporium of East Central Africa.



Ethnological Map of the Eastern Sudan.

The Nile itself imparts a distinct geographical unity to the more fertile and better watered provinces of Khartum, Senaar, Berber, Fashoda, and the Equator, forming the second division of "Central Sudan." Here the great artery forms a broad, somewhat sluggish stream, often choked with "sudd," or floating masses of tangled vegetable matter, but nevertheless generally navigable from the confluence of the White and Blue Niles at Khartum nearly to Lake Albert Nyanza. The Bahr-el-Jebel, as its upper course is called from the lake to the Sobat junction, is thickly peopled on both sides and along the tributary valleys by numerous tribes and even great nations (Dinka, Shilluk, Mittu, &c.) of pure Negro and Negroid stock. Lower down the White Nile, that is, the section from the Sobat to the Azrek confluence,

is held mainly by intruding "Baggara" and other cattle-breeding Arab tribes, interspersed with isolated groups of Nuba, Funj, and other peoples now mostly assimilated to them in speech, usages, and religion.

Although more varied in aspect, the third division of "Eastern Sudan" enjoys a certain unity at least in its outlines, its three provinces of Suakin, Taka, and Massowah being comprised between the middle course of the Nile and the Red Sea, and stretching from the Egyptian frontier southwards to Abyssinia. Here the main stream from Khartum to Asuan (Syene), where it enters Egypt, is essentially a mountain torrent, describing great bends to the right and left while forcing its way over six cataracts and other obstacles through the sandstone and granitic ridges intersecting the Nubian wilderness on the

RACE	MAIN DIVISIONS	LOCALITY	REMARKS
HAMITE	<i>Tibbu</i> : Baele; Zoghawa; Wanyanga <i>Bishari</i> : Hadendoa; Hallenga; Ababdeh; (Beja) Beni-Amer <i>Danakil</i> : Adaiel; Dahimela, &c.	N. and N.W. Darfur Between Red Sea and Nile, 15°-25° N. Between Abyssinia and the coast, 10°-15° N. Massowah district Gulf of Aden Coast E. and S. of Gojam	<i>Hamite</i> is here equivalent to the <i>Kushite</i> of some writers; but is taken in a wider sense, answering to the African Division of the Mediterranean or Caucasian anthropological type of mankind. For the removal of the Tibbu from the Negro to this connection, see NATURE, March 1, 1883 ("North African Ethnology"). Most of these are zealous Muhammadans.
	<i>Saho</i> ; <i>Bogos</i> ; <i>Habab</i> <i>Somali</i> : Idur; Isa; Mijarten, &c. <i>Galla</i> (Orma) } Yeju; Wollo; Mecha, &c.		
SEMITE	<i>Arab</i> : Kababish; Sheygieh; Robabat, &c. Homran; Rekhabin; Alawin Homran; Hamr, El-Homr; Habanieh, &c. Ziaieh; Bahemid <i>Himyaritic</i> : Tigre; Dembela; Lasta Harrari	W. from Nile between Dongola and Khartum Senaar Kordofan and Darfur N. Darfur N. and E. Abyssinia E. from Shoa	The <i>Arab Semites</i> are recent intruders, mainly <i>viâ</i> Isthmus of Suez and Egypt; the <i>Himyarites</i> are intruders from prehistoric times from South Arabia <i>viâ</i> Strait of Bab-el-Mandeb. The former are all fierce Muhammadans, the latter mostly monophysite Christians.
	<i>Barabra</i> (mixed) } Kenus; Mahasi; Dongolawi <i>True Nuba</i> : Kargo; Kulfan; Kolaji Jebel Nuba; Tumali <i>Fur</i> : Fur; Konjara; Fongoro, &c. <i>Sub-Nuba</i> : Takruri Barea; Basé (Kunama) Funj; Hamagh	Nile Valley from Egypt to Old Dongola Kordofan Darfur Gallibat Taka (Mareb Valley) Senaar	The Nubas hold an intermediate position between the Negro and Hamite; but the speech is distinctly Negro, and has no connection with the Fulah of West Sudan, as has been supposed by Fr. Müller and others. The Kordofan Nubas represent the original stock and are mainly pagans; those of the Nile are Negroid and a historical people, Christians from the sixth to the fourteenth century, since then Muhammadans of a mild type. They represent the Uaua of the Old Egyptian records, the <i>Nuba</i> of Strabo, and the <i>Nubate</i> of later times.
NEGRO	<i>Sudanese</i> : Birkit; Masalit; Abu-Sarib, &c. Shilluk; Dinka; Nuer Fallaugh; Kunkung; Ninak, &c. <i>Nilotic</i> : Krej; Bongo (Dor); Mittu (Moro) Bari; Madi; Lur; Latuka	Darfur White Nile and B. el Arab Sobat basin About W. tributaries White Nile B. el Jebel, N. of Lake Albert Nyanza	Most of the Negroes have been reduced in recent years, and are still virtually pagans. Some, such as the Mittu, Krej, and Bongo, are of a red-brown rather than a black complexion, but the type is Negro, although the speech of all except the Dinka shows grammatical gender. They are very brave and fierce, but easily controlled by firmness and kindness.
BANTU	Waganda; Wanyoro; Wasoga; Wagamba	Extreme S. frontier, N. side Lake Victoria Nyanza	The Bantus have not been reduced, although included in the Moudirié de l'Equateur of Messedaglia's official "Carte du Sudan" (Khartum, 1883).

east and the Libyan desert on the west. It is thus practically useless for navigation, and the communications with the upper provinces have to be maintained by difficult caravan routes subtended like arcs to the curves of the stream, or radiating from Berber near the Atbara confluence to Suakin on the Red Sea. But south of these dreary solitudes the Atbara basin itself, comprising parts of the Berber and Taka provinces, is a magnificent sub-tropical land, the flower of the Khedive's possessions, diversified with a varied succession of dense woodlands, rich pastures, and well-watered arable tracts. Hence the route traversing this region from the Nile, through Kasala to the Red Sea at Massowah, although much longer, will be found far more practicable than the more northern highway to Suakin. Like the land itself, the inhabitants of this division present a great diversity of type, the narrow valley of the Nile being occupied by Nubas from the Egyptian frontier to the Old Dongola, and thence on the left bank by Kababish Arabs to Khartum, while the whole region between the Nile and Red Sea, and from Egypt southwards to Abyssinia, is the almost exclusive domain of the great Hamitic Bishari nation. Along the northern frontier of Abyssinia these come in contact at various points with Arab, Amhara, and Tigre peoples, and in one instance even with an isolated Negroid or

Nuba tribe, the Basé (Kunama) of the Khor-el-Gash (Mareb) Valley.

The fourth division of Harrar, with its three provinces of Zeyla, Berbera, and Harrar stretching along the northern verge of Somaliland eastwards to Cape Gardafui, is practically separated from the rest of Egyptian Sudan by the intervening "Empire" of Abyssinia, and will be totally severed whenever that state resumes possession of its natural outport of Massowah. It is mainly an arid strip of coastlands fringing the Red Sea and Gulf of Aden, and inclosing the recently-founded Italian and French settlements on Assab Bay and at Obokh on the Gulf of Tajurrah. With the exception of the small Amharic enclave at Harrar, the whole of this division is inhabited by peoples of Hamitic stock and speech—Saho and Danakil, between the Red Sea and Abyssinia, Idur, and other Somali tribes along the Gulf of Aden.

Egyptian Sudan thus stretches north and south across nearly twenty-four degrees of latitude from Egypt to the equator, or about 1650 miles, and west and east across twenty-two degrees of longitude from Wadai to the Red Sea at Massowah, or from 1200 to 1400. Within these limits it has a total area of at least 2,500,000 square miles, with a population that cannot be estimated at less than 12,000,000. Of these probably three-fourths are of pure



or mixed Negro descent, and mostly pagans or nominal Muhammadans. The rest belong to various branches of the Semitic and Hamitic stocks, and are nearly all Muhammadans of a more or less fanatical type. In his valuable "Report on the Sudan for 1883" Lieut.-Col. Stewart remarks: "Besides the main division of the people into Arab and Negro, they are again subdivided into a number of tribes and sub-tribes, some sedentary and others nomad. Of the Negro tribes all are sedentary and cultivators, but the Arabs are for the most part nomads or wanderers, each tribe within certain well-known limits. All these Arab tribes are large owners of cattle, camels, horses, and slaves. These last, along with the Arab women, generally cultivate some fields of doora (a kind of millet) or corn, sufficient for the wants of the tribe. The Arab himself would consider it a disgrace to practise any manual labour. He is essentially a hunter, a robber, and a warrior, and, after caring for his cattle, devotes all his energies to slave-hunting and war" (p. 8).

This presents a fairly accurate picture of the natural relations of the people in all respects except as regards the main division into two ethnical groups—Arab and Negro. From what has been already stated it is obvious that this is a totally inadequate distribution. It is another and signal instance of that official ignorance or disregard of the racial conditions that has ever been such a fruitful source of political troubles and disasters in lands governed or controlled by foreign administrators. As a matter of fact, Egyptian Sudan is a region of great ethnical complexity, and so far from being occupied by Arabs and Negroes alone, there are scarcely any Arabs or Negroes at all anywhere east of the Nile between Khartum and Egypt. To designate as Arabs the tribes at present blocking the Suakin-Berber route, as is currently done, betrays a depth of ethnological ignorance analogous to that of the writer who should group Basques, for instance, and Slavs in the same category. The Arabs themselves are comparatively recent intruders, although it is possible that some, such as the Beni-Omr, now fused with the Funj and Hamagh Negroid peoples of Senaar, may have found their way across the Red Sea into the Nile basin in pre-Muhammadan times. But the Bishari tribes about Suakin are the true autochthonous element, lineal descendants of the Blemmyes and other historic peoples whose names are enrolled in Greek, Roman, and Axumite records. But these and other points will be made clear by the above synoptical table, with accompanying map, of the East Sudanese races and tribes.

Khartum, the centre of administration for all these discordant elements, has been brought within the sphere of civilisation since 1819, when it was occupied by the Egyptian troops under Ismael Pasha. At that time it was a mere outpost of the Hamagh kingdom, Senaar; but, thanks to its convenient position at the confluence of the two Niles midway between the Mediterranean and the equator, it soon rose to importance under the strong government of Mehemet Ali. Under Khurshid Pasha (1826–37) its skin and reed hovels were replaced by substantial brick houses, and at present it is by far the largest and most flourishing place in Central Africa, with a motley population of over 40,000, including the garrison troops. Here considerable quantities of goods in transit are always in deposit; here are resident many Europeans interested in the African trade, and in the more philanthropic work of African culture and exploration. Khartum has thus become inseparably associated with all the work done during the last half century towards developing the material resources of the land and raising the moral status of its inhabitants. At its mention, the names of Petherick, Beltrami, Schweinfurth, Baker, Gordon, Marno, Junker, Linant de Bellefonds, Emin Bey, Gessi, and many other heroic pioneers in the cause of African progress, are irresistibly conjured up. Such names plead silently but eloquently for its preservation to civilisation in the better sense of the word, and make us feel how great a crime against humanity would be its abandonment to barbarism and the villainous Arab slave-dealers of Central Africa.

A. H. KEANE

### NOTES

WE understand that subscriptions to a memorial to the late Mr. F. Hutton are being asked for in a paper in which the name of Prof. Huxley is mentioned as one of the committee and an intending subscriber. We are authorised to state that the name of Prof. Huxley has been employed without his knowledge.

WE have received the following subscriptions on behalf of the Hermann Müller Fund:—Prof. W. H. Flower, F.R.S., 1*l*.; Mr. W. E. Hart, 1*l*.; K., 10*s*.

MR. FRANK E. BEDDARD, M.A., of the University of Oxford, Naturalist to the *Challenger* Commission, has been selected out of thirteen candidates for the post of Professor to the Zoological Society of London, in succession to the late Mr. W. A. Forbes. Mr. Beddard was a pupil of the late Prof. Rolleston, and for the past year has been employed on editorial and other work connected with the issue of the official reports on the scientific results of the *Challenger* Expedition. He has also been intrusted with the examination and description of the *Isopoda* collected by the Expedition, and has the reputation of being a most promising and enthusiastic naturalist.

AMONG other legacies in the will of the late Sir William Siemens are 1000*l*. each to the Scientific Relief Fund of the Royal Society and the Benevolent Fund of the Institution of Civil Engineers.

THE Cunningham Medal of the Royal Irish Society was presented on the 15th inst. to Mr. John Birmingham of Tuam, for his "Contributions to the Advancement of Knowledge in Astronomy."

MR. ARCHIBALD GEIKIE, F.R.S., Director-General of the Geological Survey of the United Kingdom, will give the first of a course of five lectures on the Origin of the Scenery of the British Isles, on Tuesday next (January 29), at the Royal Institution of Great Britain.

IN January, 1883, one of the officers of the Geological Survey of Ireland, Mr. E. T. Hardman, was selected to proceed to Western Australia for the purpose of taking part in an exploration of the Kimberley district of that colony. He took the field in April last, and continued on active service in the bush until near the end of September, having in this interval travelled at least 1500 miles, and having obtained materials for a first geological sketch-map of about 12,800 square miles of country. He has determined the sequence of formations which begin with certain quartzites, schists, and other metamorphic rocks, which he classes provisionally as altered Lower Silurian, but which may be of Archæan age. These are succeeded by limestones and sandstones with gypsum, &c., which are referred to Upper Carboniferous horizons. Certain basalts and felstones occur, the age of which is uncertain. The youngest deposits are Pliocene sands, gravels, conglomerates, and marly limestones ("pindar" of the natives) overlaid by river gravels, extensive plains of alluvium, and, along the sea-coast, by raised beaches.

MR. BARNUM's so-called white elephant arrived safely last week at the Zoological Gardens from Burmah, and has already attracted many visitors. Prof. Flower, writing to the *Times*, says:—"The Burmese elephant now deposited in the Zoological